Serial Number: 10/074,331
Claim Amendments
May 19, 2004

1. (previously presented) An abrasive wheel for use in separating one quad flat, no-lead, integrated circuit package from another by cutting through a bridging element which joins them, each package comprising a printed circuit board in a protective body therefor, the abrasive wheel comprising a disc formed of abrasive material comprising abrasive particles bonded in a matrix comprising cured polyimide resin, and metal particles, wherein the metal particles have been welded together, the disc forming a cutting edge having a maximum thickness of the order of 350 micron, whereby the cut is substantially straight and is substantially free of smears and burrs.

2. (original) An abrasive wheel according to Claim 1, wherein the disc has a thickness of 300 microns ± 12.7 microns.

3. (previously presented) An abrasive wheel for use in separating one quad flat, no-lead, integrated circuit package from another by cutting through a bridging element which joins them, each package comprising a printed circuit board in a protective body therefor, the abrasive wheel comprising a disc formed of abrasive material comprising abrasive particles bonded in a matrix comprising cured polyimide resin, wherein the resin is formed by the reaction of 4,4'-oxydianiline and 3,3',4,4'-benzophenonetetracarboxylic dianhydride, and metal particles, the disc forming a cutting edge having a maximum thickness of the order of 350 micron, whereby the cut is substantially straight and is substantially free of smears and burrs.

4. (cancelled)

5. (previously presented) An abrasive wheel according to Claim 1, wherein the metal particles are selected from one or more of copper, tin, nickel, cobalt, iron, zinc, indium, antimony and chromium.

6. (original) An abrasive wheel according to Claim 1, wherein the abrasive particles are natural or synthetic diamond or CBN.

7. (original) An abrasive wheel according to Claim 1, wherein the wheel comprises a disc having a central hole for mounting on a rotary shaft.

8. (previously presented) Cutting apparatus for use in separating one quad flat, no-lead, integrated circuit package from another by cutting through a bridging element which joins them, the apparatus comprising a plurality of abrasive wheels, each wheel comprising a disc formed of abrasive material comprising abrasive particles bonded in a matrix comprising cured polyimide resin and metal particles, wherein the metal particles have been welded together, the disc forming a cutting edge having a maximum thickness of the order of 350 micron, the wheels being mounted in parallel on a common shaft, whereby cuts in parallel bridging elements may be made when the shaft is rotated, and whereby the cut is substantially straight and is substantially free of smears and burrs.

9. (cancelled)

10. (currently amended ) A method of separating one quad flat, no-lead, integrated circuit package from another by cutting through a metal bridge elements joining adjacent packages, each package comprising a printed circuit board in a protective body therefor, the method comprising rotating an abrasive wheel to cut through a bridge element, the wheel having a cutting edge having a maximum thickness of the order of 350 micron and formed of bonded abrasive particles in a matrix comprising cured polyimide resin, wherein the resin is formed by the reaction of 4,4'–oxydianiline and 3,3',4,4'–benzophenone tetracarboxylic dianhydride, and metal particles, whereby the cut is substantially straight and little or no smears or burrs are formed on the cut surface.

11. (currently amended) A method of separating one quad flat, no-lead, integrated circuit package from another by cutting through a metal bridge elements joining adjacent packages, each package comprising a printed circuit board in a protective body therefor, the method comprising rotating an abrasive wheel to cut through a bridge element, the

wheel having a cutting edge having a maximum thickness of the order of 350 micron and formed of bonded abrasive particles in a matrix comprising cured polyimide resin and metal particles, wherein the metal particles are welded together in the matrix, and whereby the cut is substantially straight and little or no smears or burrs are formed on the cut surface.

12. (original) A method according to Claim 11, wherein the metal particles are selected from the group of copper, tin, nickel, cobalt, iron, zinc, chromium, antimony, indium, aluminum and titanium.

13. (currently amended) A method according to Claim [9] 10, wherein the wheel is rotated at about 11,000 to about 17,300 rpm surface feet/minute.

14. (original) A method according to Claim 13, wherein the wheel is rotated at 15,708 rpm surface feet/minute.

15. (cancelled)

16. (cancelled)

17. (cancelled)

18. (cancelled)

19. (cancelled)

20. (cancelled)

21. (currently amended) A method according to Claim [17] 13, wherein the wheel is rotated at about 14,137 surface feet/minute and a feed rate of from about 18 to about 30 mm/s.

22. (cancelled)

23. (cancelled)

24. (cancelled)

25. (cancelled)

26. (original) A method of making an abrasive wheel having a cutting edge adapted to cut through a bridging element joining two integrated circuit packages and to leave a substantially straight cut substantially free of smears and burrs, the method comprising subjecting to temperature and pressure a composition comprising abrasive particles, metal particles and of a polyimide resin to cause the formation of a matrix having a high glass transition temperature containing the abrasive particles and the metal particles to weld together within the matrix, in a mould shaped to form an annulus defining a cutting edge having a maximum thickness of the order of 350 micron.

27. (original) A method according to Claim 26, wherein the resin is formed by the reaction of 4,4'-oxydianiline and 3,3', 4,4'-benzophenone tetracarboxylic dianhydride.

28. (original) A method according to Claim 26, wherein the metal particles are selected from the group of copper, tin, nickel, cobalt, iron, zinc, chromium, antimony, indium, aluminum and titanium.

29. (original) A method according to Claim 26, wherein the abrasive particles are natural or synthetic diamond or CBN.